

HAZARDOUS WASTE FACILITY

PERMIT APPLICATION

PART B

II. EOD RANGE

Inventories of military ordnance items are maintained at various military installations. Because ordnance items held in military readiness stockpiles are subject to deterioration and obsolescence, action has to be taken to safely remove and demilitarize these items. Other explosive wastes may be generated from training operations. If these various items cannot be reworked, they must be demilitarized which means to render the item no longer functional for its intended military use and to free it of hazard (e.g., explosive, reactive) to the point that salvageable parts may be sold to the public.

Ordnance from stockpiles are brought to the EOD range for scheduled operations. There is no storage on the EOD range for these items prior to a scheduled operation. While typical items like flares and TP ammunition are awaiting treatment, they do not represent an environmental concern since they are intact end items. Likewise, ordnance debris from launch operations or found items from the Camp Cooke era are not stored at the EOD range but are subject to thermal treatment shortly after arrival.

The chemical and physical nature of typical reactive waste and the Waste Analysis Plan for sampling, testing, and evaluating these items is submitted in accordance with the requirements of 40 CFR 270.14 (b)(2).

C-1. CHEMICAL AND PHYSICAL ANALYSES [40 CFR 264.13(a) and 270.14(b)(2)]

Wastes which are to be treated at Vandenberg AFB will generally be hazardous by virtue of their reactive properties. The items to be treated are physically intact explosive ordnance items including unserviceable munitions and unexploded ordnance. Although off-specification items may be treated, the chemical constituents are consistent with the data presented in this section. Table C-1 presents a list of basic compositions for standard energetic materials in general use.

The reactive munitions which are treated by OB/OD generally consist of a variety of explosive chemical fill materials, along with associated metal casings, projectiles, and primer components. The metal components account for a majority of the mass of the munitions. The reactive materials are usually less than 20% of the gross munitions weight. A number of energetic compounds are present in the munitions. These compounds fall into four general classes, including pyrotechnic compositions, propellants, priming compositions, and high explosives. Propellants, pyrotechnic, and priming compositions are materials which react by deflagration. The high explosive reactions are manifested in the form of detonations. When the munitions are treated in the OB/OD units, miscellaneous combustion and detonation products are formed. These products are no longer reactive, but may result in environmental impacts to the receiving media. These impacts are addressed in Section E. Due to the nature of the reactions, the primary treatment products are gases. For this reason, the air impacts are generally the primary concern.

II. EOD RANGE

The information provided in this section is submitted in accordance with the requirements of 40 CFR 270.15 and 264.170-176.

Explosive ordnance disposal activities at Vandenberg AFB support two separate mission requirements. Clearing ordnance debris from missile launch operations and "found" ordnance from Camp Cook activities is one aspect. Another is demilitarization of unserviceable, out-dated, or obsolete munitions which is an adjunct of proper munitions stockpile management.

While much of the former activity is also included in the latter, a distinction is made because not all missile ordnance debris, or found ordnance, can be moved to the EOD range for disposition. Depending on the condition of individual items, many must be blown in place.

Munitions stockpiles are subject to inventory turnover as is any stockpile of goods. Munitions may become obsolete (weapons systems changes), outdated (shelf-life expiration), or unserviceable (e.g., dings, dropped items). When items are relegated to these categories, disposal is required and performed as prescribed in various technical orders. A disposition request and destruction certificate are shown in Appendix C-2.

The explosive ordnance items treated at Vandenberg are complete items with a specific design and use. These items will have a specific nomenclature, stock number and description of use or destruction (as required) in a published Air Force Technical Order. Technical Order 11A-1-42 designates whether an explosive ordnance item will be thermally treated by open burning or open detonation (process code T04).

The amount of plastic explosive (Composition C-4) to be used as a donor charge for the open detonation of a particular explosive ordnance item is specified in the T.O. 60-series document which covers the specific ordnance end item. "Found" or debris items for which technical information may not be available are detonated at a ratio of approximately 7:1 for the amount of C-4 to the net explosive weight of the item.

Munitions destined for destruction are identified by administrative actions initiated by 394 ICBMTMS/MBawe. These actions occur because munitions have exceeded an established shelf life, constituents have become altered or unstable, or there has been loss of lot-number identity. When those actions occur, the munitions are listed on an Ammunition Disposition Request (AF Form 191). When sufficient munitions have accumulated to require an open burn/open detonation operation, the munitions are gathered by EOD personnel and transported to the EOD range.

Munitions, donor charges, and fuzes are transported to the temporary holding areas (EOD photograph #7) where they remain only until moved to the open detonation site (EOD photograph #10).

If munitions are to be treated by open detonation, the item is placed in the detonation pit (EOD photograph #10). Additional explosive material, such as C-4, will be placed on and around the item. The C-4 will also be affixed with an electric detonator which is hardwired to the electrical initiator at the personnel bunker. The net explosive weight limitation for open detonation is 250 pounds for items with casings which could produce fragmentation hazards, and 500 pounds for uncased items. Immediately after thermal treatment by detonation, the residue is examined to determine if all explosive material has been successfully treated. If any explosive material remains, it is again affixed with C-4 explosive and detonated. When all material has been successfully treated, all scrap metal is placed in the burial pit within the confines of the EOD range (EOD photograph #11).

Historically, at Vandenberg AFB thermal treatment of energetic material by burning has been performed in a burn furnace. However, the burn furnace was removed in 1987, and open detonation has been used exclusively since then. There is a requirement to have the capability to burn certain types of energetic material and a new burning device is planned. Pending the installation of a burning device, open detonation will be used exclusively.

A new burning device is planned for the location of the previous burn furnace. A concrete pad will be placed at the former site to provide an adequate foundation for the new burn box. The burn box will be a shipping container no longer needed for its original use. The container has top and bottom sections such that the bottom section will be used to thermally treat waste explosives. The top half will be removed for a thermal treatment operation and replaced after treatment to act as a precipitation cover.

A box-shaped screen, open on one side, will be placed around the bottom of the burn box during the thermal treatment process. The screen will prevent projectiles from exiting the burn box.

To prepare for an open burn operation, the burn box will be partially filled with scrap combustible material. Waste munitions will be placed on the combustible material, and diesel fuel will be poured over both to facilitate combustion. The fire will be ignited with delayed-start thermite grenade. The delay is necessary to allow EOD personnel to withdraw to safety positions. The fire is allowed to burn itself out and cool for a 12-24 hour period.

EOD personnel will return after the cool-down period and examine the residue to make sure that all items were successfully treated. Scrap metal will be separated from the ash and placed in the burial pit. The ash will be placed in a covered container and analyzed for reactive and toxicity characteristics. Final disposition of the ash will depend on the analytical results.

D-1. CONTAINERS [40 CFR 264.17(a) and (b), 264.175 to 264.177 and 270.15 to 270.21]

Containers used for storage of potentially hazardous waste at the EOD range will be covered and stored on pallets to preclude contact with standing water. The energetic materials to be treated do not contain free liquids and the resulting scrap metal/ash can not contain free liquids. Therefore, it is not necessary to demonstrate the absence of free liquids.

D-2. TANKS [40 CFR 270.16]

Tanks will not be used for hazardous waste storage at the EOD range; therefore, Section D-2 is not applicable.

D-3. SURFACE IMPOUNDMENTS [40 CFR 270.17]

Surface impoundments will not be used at the EOD range; therefore, Section D-3 is not applicable.

D-4. WASTE PILES [40 CFR 270.18]

Waste piles will not be used at the EOD range; therefore, Section D-4 is not applicable.

D-5. INCINERATORS [40 CFR 270.19]

Incinerators will not be used at the EOD range; therefore, Section D-5 is not applicable.

D-6. LAND TREATMENT [40 CFR 270.20]

Land treatment of hazardous wastes will not be used at the EOD range; therefore, Section D-6 is not applicable.

D-7. LANDFILLS [40 CFR 270.21]

Hazardous wastes will not be landfilled at the EOD range; therefore, Section D-7 is not applicable.

E-3. AIR ASSESSMENT [40 CFR 264.601(c)]

E-3a. Volume and Characteristics of the Waste [40 CFR 264.601(c)(1)]

The volume and characteristics of the waste are discussed in Section E-1a.

E-3b. Reduction or Prevention of Emissions [40 CFR 264.601(c)(2)]

There are no structures or control systems to prevent or reduce emissions of hazardous constituents to the air from OB/OD activity at the EOD Range.

E-3c. Operating Characteristics [40 CFR 264.601(c)(3)]

The OB/OD operations at the EOD range occur intermittently. Nearly all of the energetic materials are transformed into gaseous or particulate form in both the OB and OD treatment processes. Operating procedures are presented in Section D. The time required for the OB process consists of three components which include the following:

- waste placement and stacking (1-6 hours),
- active burn period (1 hour), and
- cool-down period (12-24 hours).

Emissions of treatment by-products are only associated with the active burn period. The majority of the release occurs in the first 10 minutes of the burn period. The emissions associated with the OD process are nearly instantaneous due to the nature of the treatment process.

E-3d. Atmospheric, Meteorological, and Topographic Characteristics [40 CFR 264.601(c)(4)]

The OB/OD units at the EOD range are situated on flat terrain. There are no complex topographic features in the vicinity. The meteorologic conditions for the EOD range are presented in Table E-1.

E-3e. Existing Air Quality [40 CFR 264.601(c)(5)]

The air quality in Santa Barbara County meets the National Ambient Air Quality Standards shown in Table E-4.

E-3f. Assessment of Air Migration Potential [40 CFR 264.601(c)(6) and (c)(7)]

In order to assess the potential for contaminant migration via the air medium, the types and quantities of emissions must be identified for the OB/OD treatment methods as applied to the routine waste streams. A search of available literature reveals that there is some data regarding the detonation products of explosive materials but a scarcity of information on OB of explosives. The following discussion on detonation emissions is excerpted from AP-42 (EPA).

The emissions from explosives detonation are influenced by many factors such as explosive composition, product expansion, method of priming, length of charge, and confinement. These factors are difficult to measure and control in the field and are almost impossible to duplicate in a laboratory test facility. With the exception of a few studies in underground mines, most studies have been performed in laboratory test chambers that differ substantially from the actual environment. Any estimates of emissions from explosives use must be regarded as approximations that cannot be made more precise, because explosives are not used in a precise, reproducible manner.

Carbon monoxide is the pollutant produced in greatest quantity from explosives detonation. Trinitrotoluene, an oxygen deficient explosive, produces more CO than most dynamites, which are oxygen balanced. But all explosives produce measurable amounts of CO. Particulates are produced as well, but such large quantities of particulate are generated in the shattering of the rock and earth by the explosive that the quantity of particulates from the explosive charge cannot be distinguished. Nitrogen oxides (both NO and NO₂) are formed, but only limited data are available on these emissions. Oxygen deficient explosives are said to produce little or no nitrogen oxides, but there is only a small body of data to confirm this. Unburned hydrocarbons also result from explosions, but in most instances, methane is the only species that has been reported.

By utilizing the estimated emissions rates (Tables E-1 and E-2, Appendix E) in conjunction with the typical charge loading in the treatment units, some worst-case emissions can be generated. These worst cases are presented in Table E-5. By inputting the worst-case emissions rates into the PUFF computer model, exposures of receptors can be calculated at various distances from the unit. The nearest off-site receptor is approximately 1000 meters from the unit. The worst-case exposures for each NAAQS compound of concern are also shown in Table E-5. None of the exposure rates exceed the standard levels. A description of the computer model utilized to estimate concentrations of air contaminants and the computer printout of the model runs of interest is included in Appendix E.

E-4. POTENTIAL IMPACT ASSESSMENT [40 CFR 264.601(a), (b), and (c)]**E-4a. Land Uses [40 CFR 264.601(a)(6) and 40 CFR 265.382]**

The minimum distance from the open burning or open detonation to the property of others for 101 to 1000 pounds of waste explosives is 1,250 feet as prescribed in 40 CFR 265.382. The normal exclusion distance for any operation at the EOD range is 2,400 feet which exceeds the minimum requirement. The distance to the nearest property line is approximately 2.5 miles.

Table E-5. Worst-Case Emissions for EOD Range

Constituent	Scenario	Emissions (g)	Highest off-site concentration ^a ($\mu\text{g}/\text{m}^3$)	Standard
CO	5 pounds RDX (detonation)	567	0.008	40,500 (1 hour average)
NO _x	2.75 pounds propellant burn)	249	0.0001 (24-hour average)	100 annual average)
Particulates		0	0	260 (24-hour average)

^aAssumes stability Class 1 - worst daytime case, windspeed of three miles per second and 1000 meters from source.

Since all OB/OD operations occur well within the Vandenberg AFB boundary, there is no effect on land use outside the boundary.

There are no impacts on land use from any of the other processes described in this permit application.

E-4b. Human Health [40 CFR 264.601(a)(8), 264.601(b)(10), and 264.601(c)(6)]

Due to the nature of thermal treatment operations at the EOD Range, nearly all contaminant exposures will be due to atmospheric transport of gaseous and particulate compounds. Therefore, the primary health impacts would be as a result of this mechanism. None of the anticipated emissions are included in the National Emission Standards for Hazardous Air Pollutants. Therefore, little or no health impacts are expected to occur as a result of treatment operations at the EOD range.

E-4c. Vegetation and Wildlife [40 CFR 264.601(a)(9), 264.601(b)(11), and 264.601(c)(7)]

No noticeable effects are anticipated on either plants or soils due to particulate emission. Most research has been performed on gaseous pollutants with little done on particulates. Thus, the levels at which toxic response occurs from these materials are not well defined. However, levels are significantly lower than documented levels needed to produce noticeable plant effects (e.g., soot-clogged stomata).

Plants are relatively insensitive to CO at the lower levels of concentrations that have been found to be toxic for animals. Experiments were performed where over 100 plant species were exposed to CO concentrations ranging from 115,000 to 575,000 ug/m³. Exposure time ranged from 7 to 23 days. Concentrations of 115,000 ug/m³ caused "practically" no growth retardation suggesting that concentrations of CO needed to affect plant growth are considerably higher than those normally encountered in ambient air. Therefore, no vegetative damage should occur as a result of CO emissions.

Experimental results indicate that a minimum NO_x concentration of between 4000 to 9000 ug/m³ for an 8-hour period is necessary to cause a 5% injury level for the most sensitive plants. As this level is much greater than the peak ambient NO_x concentration projection for the facility vicinity, no adverse impacts are anticipated as a result of NO_x emissions (Reference: Air Quality Criteria for Particulate Matter).

Chapparal and ice plant are the vegetation species on and near the EOD range. These hardy species are unlikely to be affected by thermal treatment operations.

All other operations discussed in this permit application are either conducted indoors or adjacent to disturbed areas such as pavement, graded soils, and man-made facilities. Impacts on local flora are expected to be negligible.

Throughout the whole of Vandenberg AFB, there is abundant wildlife (Reference SMC/ET). None was observed, nor expected, at any of these facilities. However, it can be inferred that wildlife is not affected by these existing operations.

E-4d. Impulse Noise

Open detonations occur infrequently at Vandenberg AFB. Operations are generally scheduled for a four-hour period between 10 AM and 2 PM. This allows the morning fog to dissipate and the operation to proceed before the afternoon fog appears. The senior EOD supervisor will delay an operation if fog would amplify the sound effects and potentially cause damage. By following "best practice" techniques, impulse noise should not be of concern.

II. EOD RANGE

F-1. SECURITY

Security procedures to be implemented in order to prevent hazards are described below.

F-1a. Security Procedures and Equipment [40 CFR 264.14]

A waiver of the security requirements is not requested.

F-1a(1). 24-Hour Surveillance System [40 CFR 264.14(b)(1)]

The EOD range is not protected by a 24-hour surveillance system. However, the EOD area is located within the confines of Vandenberg AFB which is afforded 24-hour security regarding entrance to the installation. The OB/OD unit has scheduled operations, and with respect to timing of these operations, security procedures are strictly followed. The waste is thermally treated or detonated almost immediately after it is brought to the site; therefore, at these units, there will be no security requirements for storage of reactive waste at the OB/OD unit. However, as a safety precaution after an open burn operation, personnel are neither allowed on the EOD range nor to approach the site prior to an appropriate cool-down period of at least 12 hours, but which may be up to 24 hours. Consequently, the cool-down period prevents any physical contact with potentially dangerous material.

Standard operating procedures (Appendix F-2) for EOD personnel assigned or attached to Vandenberg AFB require at least two qualified EOD personnel, one of which must be qualified as a supervisor, to perform disposal operations. Support personnel will not exceed a two-to-one ratio to EOD personnel.

The EOD supervisor will brief all personnel on disposal operations, methods of initiation, and safety factors involved and assign duties to personnel.

Physical access to the EOD range is at designated entrance gates. Base agencies (Appendix F-2) are notified of scheduled operations by the EOD team before any explosive or burn initiation. Radio contact with the Vandenberg AFB control tower is maintained. A first aid kit or medical personnel with an ambulance will be on-site.

F-1a(2). Barrier and Means to Control Entry [40 CFR 264.14(b)(2)(i) and (ii)]

F-1a(2)(a). Barrier [40 CFR 264.(b)(2)(i)]

The EOD range has artificial and natural barriers that completely enclose the site (EOD Photographs 1, 2, 3 and 4).

I-1e(2). Closure of Tanks [40 CFR 264.197]

No tanks are used to store wastes at the EOD range.

I-1e(3). Closure of Waste Piles [40 CFR 264.258]

Waste piles will not be located at the EOD range.

I-1e(4). Closure of Surface Impoundments [40 CFR 264.228]

Surface impoundments will not be located at the EOD range.

I-1e(5). Closure of Incinerators [40 CFR 264.351]

Incinerators will not be located at the EOD range.

I-1e(6). Closure of Landfills [40 CFR 264.310]

Landfills will not be located at the EOD range.

I-1e(7). Closure of Land Treatment Facilities [40 CFR 264.280]

Land treatment activities will not occur at the EOD range.

I-2. POST-CLOSURE PLAN [40 CFR 264.117, and 264.118, and 270.14(b)(13)]

Open detonation of ordnance containing organic PEP may result in unexploded ordnance being buried (e.g., being driven downward by detonation) unless operating procedures require subsurface examination and removal. Unexploded ordnance can be located and removed from beneath OD units, but the process is very time consuming and can be dangerous. The most diligent effort may not remove all unexploded ordnance, and it is unlikely that a certification regarding the removal of all unexploded ordnance could ever be issued. Therefore, closure activity will consist of reasonable efforts to locate and remove unexploded ordnance and tests of surface soil for toxicity characteristics and reactivity.

Unexploded ordnance would be subjected to additional detonation processes until no identifiable material remained. Soil test results would determine whether the OD site would require soil removal or placement of a permanent cap to prevent future disturbance.

If a cap is placed over closed OD sites, the cap would be inspected on a periodic basis to evaluate the integrity of the cap. The frequency of inspection would depend on the material used for the cap.

I-11

Post-closure groundwater monitoring is not necessary since there is no effect on groundwater by these activities.

I-3. NOTICE IN DEED AND NOTICE TO LOCAL LAND AUTHORITY [40 CFR 264.119 and 264.120]

The location of closed OD sites will be noted on appropriate Air Force real property records and statements will be added regarding restricted post-closure use of the land. Notification will also be provided to appropriate State and county agencies.

I-4. CLOSURE COST ESTIMATE [40 CFR 264.142(a)(b) and 270.14(b)(15)]

The Federal Government is exempt from the financial requirements of hazardous waste regulation. Vandenberg AFB is owned and operated by the Federal Government. Therefore, closure and insurance documentations are not required, and Sections I-4 through I-9 do not apply to this facility.

I-5. FINANCIAL ASSURANCE MECHANISM FOR CLOSURE [40 CFR 264.143 and 264.150]

I-6. POST-CLOSURE COST ESTIMATE [40 CFR 264.144]

I-7. FINANCIAL ASSURANCE MECHANISM FOR POST-CLOSURE [40 CFR 264.145]

I-8. LIABILITY INSURANCE [40 CFR 264.147]

I-9. STATE ASSUMPTION OF RESPONSIBILITY [40 CFR 264.150]